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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,893	09/29/2006	Daniel Kopf	120391	8707

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EXAMINER	
HAGAN, SEAN P	

ART UNIT	PAPER NUMBER
2828	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/581,893	KOPF ET AL.	
	Examiner	Art Unit	
	SEAN HAGAN	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 12-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 12-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1 through 12 originally filed 6 June 2006. Claims 1 through 11 presented as amended sheet of claims 6 June 2006. Claims 5, 6, 7, 9, 10, and 11 amended by second amendment filed 6 June 2006. Claims 1 through 10 amended by amendment filed 5 July 2006. Claim 11 cancelled by amendment filed 5 July 2006. Claims 12 through 19 added by amendment filed 5 July 2006. Claims 1 through 10 and 11 through 18 amended by amendment received 13 February 2009. Claim 20 added by amendment received 13 February 2009. Claims 1 through 10 and 12 through 20 are pending in this application.

Response to Arguments

2. Applicant's arguments have been fully considered; they are not persuasive.

3. Applicants argue that Dahm (US Patent 5,848,080) fails to teach new limitation drawn towards the pulsewidth generated by the laser being in the range of femto- or picoseconds. This is based upon various claims within Dahm which stipulate a pulse <1.5ns. Applicants use this to support an argument that Dahm does not enable femto- or picosecond pulsing. Femto- and picosecond pulsed operation fall within the claimed range and col. 2, lines 19 through 20 of Dahm explicitly lay out the desirability of pulsewidths less than 1ns (which must be, at least, in the picosecond range). However, examiner concedes that Dahm is lacking in teachings related to the actual duration of pulses generated. While the invention of Dahm may inherently teach the generation of

such pulses (and therefor be enabled to do so), this can not be established from only what is disclosed by Dahm. Delfyett (US Patent 5,265,107) is cited to address this limitation and appears to do so sufficiently.

4. Applicants argue that one of ordinary skill in the art would not be motivated to combine Dahm and Delfyett. Delfyett teaches that the saturable absorber of Delfyett may generate pulses at least down to 10ps (Delfyett, col. 4, lines 10-24). Provided that such a pulsewidth is less than that achievable by Dahm, the saturable absorber of Delfyett would enhance the teachings of Dahm by allowing shorter pulses. This is a desirable result as Dahm teaches in col. 2, lines 19 through 22 that reduced pulse time advantageously reduces the heating of the area around the target to which the laser is directed.

5. Applicants argue that one of ordinary skill in the art would not know how to introduce the saturable absorber of Delfyett into the invention of Dahm. In making this argument, applicants state that arbitrary mixing of components from one design to another does not lead to operationally effective designs. Dahm is not constrained to the non-linear affects present in Dahm, but also allows for use of a Q-switch (Dahm, col. 5, lines 59 through 64). Furthermore, the saturable absorber of Delfyett is designed to be used in conjunction with already pulsed systems so as to reduce the pulsewidth while maintaining a stable repetition rate. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the

primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, there appears sufficient information to introduce the teachings related to the saturable absorber found in Delfyett with a system according to the teachings of Dahm.

6. As such, all claims are addressed as follows:

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 1, 2, 7, 8, 10, 12, 17, 18, and 20 rejected under 35 U.S.C. 103(a) as being unpatentable over Dahm (US Patent 5,848,080) in view of Delfyett (US Patent 5,265,107).

9. ***Regarding claim 1,*** Dahm discloses, "An amplifying laser medium" (col. 4, lines 6-9). "A laser resonator with at least one resonator mirror" (col. 4, lines 6-9). "At least one cavity dumping component" (col. 5, lines 55-58). "A pump source for pumping the laser medium" (col. 4, lines 46-51). "Wherein the cavity dumping component is an electro-optical modulator" (col. 4, lines 28-45). Dahm does not disclose, "A saturable absorber mirror." "The laser system generates femtosecond or picosecond pulses with a repetition rate greater than 10kHz." Delfyett discloses, "A saturable absorber mirror"

(col. 1, lines 35-43). "The laser system generates femtosecond or picosecond pulses with a repetition rate greater than 10kHz" (col. 4, lines 10-24). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Dahm with the teachings of Delfyett. Introduction of a saturable absorber mirror as taught by Delfyett would enhance the teachings of Dahm by facilitation of mode locking conditions at a short pulse rate (Delfyett, col. 4, lines 22=25).

10. ***Regarding claim 2,*** Dahm discloses, "Wherein the electro-optical modulator is a BBO cell" (col. 4, lines 28-45).

11. ***Regarding claim 7,*** Dahm discloses, "Wherein the laser medium is ytterbium-doped glass or Nd:YVO_4 " (col. 4, lines 6-9).

12. ***Regarding claim 8,*** the combination of Dahm and Delfyett does not disclose, "Wherein the laser medium comprises ytterbium-doped tungstates." It would have been an obvious matter of design choice to use KGW or KYW as host material, since applicant has not disclosed that this difference solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the difference.

13. ***Regarding claim 10,*** Dahm discloses, "The pump light spot consisting of a single ray or the combination of a plurality of rays" (col. 4, lines 46-51).

14. The combination of Dahm and Delfyett does not disclose, "Wherein the pump source is formed and is arranged in such a way that a pump light spot having a ratio of length to width of at least 2:1 is formed." It would have been an obvious matter of design choice to design the pump medium to have a ratio of length to width of 2:1, since applicant has not disclosed that this difference solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the difference.

15. ***Regarding claim 12,*** Dahm discloses, "Wherein the pump source is a laser diode source" (col. 4, lines 46-51).

16. ***Regarding claim 17,*** the combination of Dahm and Delfyett does not disclose, "Wherein the laser medium comprises Yb:KGW or Yb:KYW." It would have been an obvious matter of design choice to use KGW or KYW as host material, since applicant has not disclosed that this difference solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the difference.

17. ***Regarding claim 18,*** Dahm discloses, "Wherein pump light consists of the combination of a plurality of rays" (col. 4, lines 46-51). "The rays being generated by laser diodes" (col. 4, lines 46-51).

18. ***Regarding claim 20,*** Dahm does not disclose, "Wherein the repetition rate is greater than 100kHz." Delfyett discloses, "Wherein the repetition rate is greater than 100kHz" (col. 4, lines 12-15). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Dahm with the teachings of Delfyett for the reasons provided above regarding claim 1.

19. Claims 3 and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Dahm in view of Delfyett and further in view of Dell'Acqua et al. (DellAcqua, US Pub. 2005/0152426).

20. ***Regarding claim 3,*** the combination of Dahm and Delfyett does not disclose, "Wherein the electro-optical modulator is an RTP cell." DellAcqua discloses, "Wherein the electro-optical modulator is an RTP cell" (p. [0091], lines 1-5). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Dahm and Delfyett with the teachings of DellAcqua. The use of RTP electro optical modulator as Q-switch as disclosed by Dell'Acqua would have been suitable for use with the teachings of Dahm and Delfyett. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

21. ***Regarding claim 13,*** the combination of Dahm and Delfyett does not disclose, "Wherein the RTP cell comprises a component for compensating thermal drift." DellAcqua discloses, "Wherein the RTP cell comprises a component for compensating thermal drift" (p. [0092], lines 1-5). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Dahm and Delfyett with the teachings of DellAcqua for the reasons disclosed above regarding claim 3.

22. Claims 4 and 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Dahm in view of Delfyett and further in view of Duguay et al. (Duguay, US Patent 3,675,154).

23. ***Regarding claim 4,*** the combination of Dahm and Delfyett does not disclose, "At least one dispersive mirror for dispersion compensation." Duguay discloses, "At least one dispersive mirror for dispersion compensation" (col. 1, lines 46-54). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Dahm and Delfyett with the teachings of Duguay. The inclusion of dispersion compensation as disclosed by Duguay would enhance the teachings of Dahm and Delfyett by allowing reduction of pulse width of optical pulses (Duguay, col. 1, lines 38-42).

24. ***Regarding claim 14,*** the combination of Dahm and Delfyett does not disclose, "Wherein the at least one dispersive mirror for dispersion compensation is a Gires-Tournois interferometer." Duguay discloses, "Wherein the at least one dispersive mirror for dispersion compensation is a Gires-Tournois interferometer" (col. 1, lines 46-54). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Dahm and Delfyett with the teachings of Duguay for the reasons given above regarding claim 4.

25. Claims 5 and 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Dahm in view of Delfyett in view of Duguay and further in view of Applicant's admitted prior art (AAPA).

26. ***Regarding claim 5,*** the combination of Dahm, Delfyett, and Duguay does not disclose, "Wherein the laser system is formed so that, in the generation of picosecond pulses, the nonlinear phase is less than 100 mrad." "The nonlinear phase being calculated per resonator cycle and per 1% modulation depth of the saturable absorber mirror." AAPA discloses, "Wherein the laser system is formed so that, in the generation of picosecond pulses, the nonlinear phase is less than 100 mrad" (pg. 12, lines 12-25). "The nonlinear phase being calculated per resonator cycle and per 1% modulation depth of the saturable absorber mirror" (pg. 12, lines 12-25). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Dahm, Delfyett, and Duguay with the teachings of

AAPA. Operating conditions presented for operation in applicant's admitted prior art would enhance the teachings of Dahm, Delfyett, and Duguay by improving stability conditions.

27. ***Regarding claim 15,*** the combination of Dahm, Delfyett, and Duguay does not disclose, "Wherein the nonlinear phase is less than 10 mrad." AAPA discloses, "Wherein the nonlinear phase is less than 10 mrad" (pg. 12, lines 12-25). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Dahm, Delfyett, and Duguay with the teachings of AAPA. Operating conditions presented for operation in applicant's admitted prior art would enhance the teachings of the combination of Dahm, Delfyett and Duguay by improving stability conditions.

28. Claims 6, 16, and 19 rejected under 35 U.S.C. 103(a) as being unpatentable over Dahm in view of Delfyett and further in view of AAPA.

29. ***Regarding claim 6,*** the combination of Dahm and Delfyett does not disclose, "Wherein the laser system is formed so that, in the generation of femtosecond pulses, the r parameter is less than 1." AAPA discloses, "Wherein the laser system is formed so that, in the generation of femtosecond pulses, the r parameter is less than 1" (pg. 7, lines 6-18). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Dahm and Delfyett with the

teachings of AAPA. Operating conditions presented for operation in applicant's admitted prior art would enhance the teachings of Dahm and Delfyett by improving stability conditions.

30. ***Regarding claim 16,*** the combination of Dahm and Delfyett does not disclose, "Wherein the r parameter is less than 0·25." AAPA discloses, "Wherein the r parameter is less than 0·25" (pg. 12, lines 12-25). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Dahm and Delfyett with the teachings of AAPA. Operating conditions presented for operation in applicant's admitted prior art would enhance the teachings of Dahm and Delfyett by improving stability conditions.

31. ***Regarding claim 19,*** the combination of Dahm and Delfyett does not disclose, "Providing a material to be processed by plasma generation." "Processing the material using the high-repetition mode-coupled ultra-short pulse laser system of claim 1." AAPA discloses, "Providing a material to be processed by plasma generation" (pg. 1, lines 11-20). "Processing the material using the high-repetition mode-coupled ultra-short pulse laser system of claim 1" (pg. 1, lines 11-20). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Dahm and Delfyett with the teachings of AAPA. Intended use for high speed laser devices as disclosed by applicant's admitted prior art would have been a suitable application for a device according to the teachings of Dahm and Delfyett. The

selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

32. Claim 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Dahm in view of Delfyett and further in view of Powell et al. (Powell, US Patent 4,849,036).

33. ***Regarding claim 9,*** the combination of Dahm and Delfyett does not disclose, "Wherein the laser medium has a disc-like geometry." Powell discloses, "Wherein the laser medium has a disc-like geometry" (col. 1, lines 23-44). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Dahm and Delfyett with the teachings of Powell. Laser disk geometry as taught by Powell would have been suitable to use with the teachings of Dahm and Delfyett. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Conclusion

34. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

35. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

36. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SEAN HAGAN whose telephone number is (571)270-1242. The examiner can normally be reached on Monday-Friday 7:30 - 5:00.

37. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun O. Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

38. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. H./
Examiner, Art Unit 2828

/Minsun Harvey/
Supervisory Patent Examiner, Art Unit 2828